IN THE CLAIMS:

1. (currently amended) A method for providing congestion control in a communications network, the method comprising the steps of:

(a) transmitting a plurality of serial data transmission from a source node to a destination node;

(b) determining whether a congestion occurs in said network;

(c) determining a bandwidth capacity of said network;

(d) adjusting a sender rate at which said source is currently transmitting the data according to a first ~~predetermined criterion~~function of the determined bandwidth capacity if no congestion occurs; and,

(e) adjusting said sender rate of said source node according to a second ~~predetermined criterion~~function if congestion occurs.

2. (currently amended) The method of claim 1, wherein said adjusting step (d) according to said first ~~predetermined criterion~~function includes increasing the number of packets transmitted by said source node.

3. (currently amended) The method of claim 1, wherein said adjusting step (e) according to said second ~~predetermined criterion~~function includes decreasing the number of packets transmitted by said source node.

4. (currently amended) The method of claim 1, wherein said adjusting step (d) according to said first ~~predetermined criterion~~function comprises the steps of:

increasing said sender rate non-linearly~~by a specified amount at which said source node is currently transmitting the data~~; and,

returning said sender rate to a linear rate when a predetermined percentage of said bandwidth is utilized within said network.

5. (currently amended) The method of claim 1, wherein said second function varies with said determined bandwidth capacity~~adjusting step (e) according to said second predetermined criterion comprises the step of decreasing said sender rate by a specified amount at which said source node is currently transmitting the data~~.

6. (currently amended) The method of claim 1, wherein the step (e) further comprises, in calculating said second function, calculating said sender rate raised to a power exceeding unity~~any adjustment of said sender rate operates to establish a maximum data transmission rate and constant packet loss~~.

7. (currently amended) The method of claim 1, wherein the step (d) further comprises, in calculating said first function, calculating said sender rate raised to a power exceeding unity~~any said predetermined criterion of said adjusting step provides faster convergence to a stable operation~~.

8. (original) The method of claim 1, wherein said data flow from said source node is simultaneously transmitted to multiple destination nodes, and said bandwidth

capacity is determined for each said data flow transmitted to each of said multiple destination nodes.

9. (currently amended) A method for providing congestion control in a communications network, the method comprising the steps of:

(a) transmitting a plurality of serial data transmission from a source node to a destination node;

(b) monitoring a sending rate at which said source node is currently transmitting data to said network and a current rate at which said destination node is currently receiving data to determine whether a congestion state occurs; ~~and,~~

~~if a congestion state occurs, decreasing said sender rate of said source node according to a first predetermined criterion if congestion occurs;~~

(c) if no congestion state occurs, determining the bandwidth capacity of said network~~;~~ and~~,~~

~~———~~ increasing said sender rate of said source node according to a first~~second predetermined~~ function of the determined bandwidth capacity~~criterion if no congestion occurs~~; and,

(d) if a congestion state occurs, decreasing said sender rate of said source node according to a second function.

10. (currently amended) The method of claim 9, wherein said second function varies with said determined bandwidth capacity~~decreasing step according to said first~~

~~predetermined criterion comprises the step of decreasing said sender rate by a specified amount at which said source node is currently transmitting the data~~.

11. (currently amended) The method of claim 9, wherein said increasing step according to said second ~~predetermined criterion~~function comprises the steps of:

increasing said sender rate non-linearly~~by a specified amount at which said source node is currently transmitting the data~~; and,

returning said sender rate to a linear rate when a predetermined percentage of said bandwidth is utilized within said network.

12. (currently amended) The method of claim 9, wherein said decreasing further comprises, in calculating said second function, calculating said sender rate raised to a power exceeding unity~~increase and decrease of said sender rate operates to establish a maximum data transmission rate and constant packet loss~~.

13. (currently amended) The method of claim 9, wherein said increasing further comprises, in calculating said first function, calculating said sender rate raised to a power exceeding unity~~first and second predetermined criteria of said increasing and decreasing steps provide faster convergence to a stable operation~~.

14. (original) The method of claim 9, wherein said data flow from said source node is simultaneously transmitted to multiple destination nodes, and said bandwidth

capacity is determined for each said data flow transmitted to each of said multiple destination nodes.

15. (original) The method of claim 9, wherein a congestion state occurs if the rate permitted by said destination node exceeds the capacity of said source node.

16. (original) The method of claim 9, wherein said steps of increasing and decreasing said sender rate above and below an operating point for said network provide a maximum throughput at minimum delay time.

17. (currently amended) The method of claim 9, wherein the step of decreasing said sender rate ($f_D(x_i)$) according to said ~~first~~second ~~predetermined criterion~~function includes calculating the equations~~is determined according to the following equation~~:

$$x_{i+1} = x_i - \beta x^1 \quad \text{and} \quad \beta = 1 / \; mC^{1-1},$$

wherein x_{i+1} represents ~~the~~a next sending rate of data; x_i represents ~~said~~the current sending rate during cycle i; C represents the determined bandwidth capacity of said network, 1 represents a constant value greater than one; and, the value m ranges between $2 \leq m \leq 8$.

18. (currently amended) The method of claim 9, wherein the step of decreasing said sender rate according to said ~~second~~first ~~predetermined criterion~~function includes calculating the equations~~is determined according to the following equation~~:

$$x_{i+1} = x_i + \alpha x^{-k} \quad \text{and}$$

$$\alpha = \frac{C^{k+1}}{D} \quad ,$$

wherein x_{i+1} represents ~~the~~a next sending rate of data; x_i represents ~~said~~the current sending rate during cycle i; C represents the determined bandwidth capacity of said network, k represents a constant value less than negative one; and, the value D ranges between $5 \leq D \leq 20$.

19. (currently amended) A system for providing congestion control in a communications network by adjusting a sender rate between at least one sender node and destination node, comprising:

means for transmitting a plurality of data transmission from said source node to said destination node;

means for determining a bandwidth capacity of said network;

means for generating congestion feedback information based on the determined bandwidth capacity of said network to determine a congestion state; and,

means for adjusting said sender rate at which said source node is currently transmitting the data based on said congestion feedback information, ~~and~~ the adjusted rate being a function of said determined bandwidth capacity of said network.

20. (currently amended) The system of claim 19, further comprising means for utilizing said congestion feedback information to determine ~~a~~the congestion state in said network.

21. (original) The system of claim 19, wherein said generating means comprise means for monitoring said sending rate at which said source node is currently transmitting data to said network and a current rate at which said destination node is currently receiving data to generate said congestion control information.

22. (currently amended) ~~The system of claim 19~~A system for providing congestion control in a communications network by adjusting a sender rate between at least one sender node and destination node, comprising:

means for transmitting a plurality of data transmission from said source node to said destination node;

means for determining a bandwidth capacity of said network;

means for generating congestion feedback information based on the bandwidth capacity of said network to determine a congestion state; and,

means for adjusting said sender rate at which said source node is currently transmitting the data based on said congestion feedback information, the bandwidth capacity of said network, wherein, if no congestion occurs, said adjusting means increase the number of packets transmitted by said source node at a first rate and at a second rate if a predetermined range of the bandwidth capacity of said network is utilized.

23. (original) The system of claim 19, wherein said adjusting means decrease the number of packets transmitted by said source node at a predetermined rate if congestion occurs.

24. (currently amended) The system of claim 19, wherein said adjusting means includes calculating, in evaluating said function, said sender rate raised to a power exceeding unity~~operate to establish a maximum data transmission rate and constant packet loss~~.

25. (original) The system of claim 19, wherein said congestion feedback information is provided by at least one of said source node and said destination node.

26. (currently amended) A system for providing a congestion control in a communications network by adjusting the sender rate between a sender node and a destination node, comprising:

a memory for storing a computer-readable code; and,

a processor operatively coupled to said memory, said processor configured to:

(a) transmit a plurality of serial data transmissions from said source node to said destination node;

(b) determine whether a congestion state occurs in said network;

(c) determine a bandwidth capacity of said network;

(d) adjust said sender rate at which said source node is currently transmitting the data according to a first ~~predetermined criterion~~function of the determined bandwidth capacity if no congestion occurs; and,

(e) adjust said sender rate of said source node according to a second ~~predetermined criterion~~function if congestion occurs.

27. (currently amended) The system of claim 26, wherein said adjusting step (d) according to said first ~~predetermined criterion~~function includes increasing the number of packets transmitted by said source node.

28. (currently amended) The system of claim 26, wherein said adjusting step (e) according to said second ~~predetermined criterion~~function includes decreasing the number of packets transmitted by said source node.

29. (currently amended) The system of claim 26, wherein said adjusting step (d) according to said first ~~predetermined criterion~~function comprises the steps of:

increasing said sender rate non-linearly~~by a specified amount at which said source node is currently transmitting the data~~; and,

returning said sender rate to a linear rate when a predetermined percentage of said bandwidth is utilized within said network.

30. (currently amended) The system of claim 26, wherein said adjusting step (e) according to said second function varies with said determined bandwidth

capacity~~predetermined criteria comprises the step of decreasing said sender rate by a specified amount at which said source node is currently transmitting the data~~.

31. (currently amended) The system of claim 26, wherein the step (e) further comprises calculating, in calculating said second function, said sender rate raised to a power exceeding unity~~any adjustment of said sender rate operates to establish a maximum data transmission rate and constant packet loss~~.

32. (currently amended) The system of claim 26, wherein the step (d) further comprises calculating, in calculating said first function, said sender rate raised to a power exceeding unity~~any said predetermined criterion of said adjusting step provides faster convergence to a stable operation~~.

33. (currently amended) A machine-readable medium having stored thereon data representing sequences of instructions, and the sequences of instructions which, when executed by a processor, cause the processor to:

transmit a plurality of serial data transmissions from a source node to a destination node;

monitor a sending rate at which said source node is currently transmitting data to said network and a current rate at which said destination node is currently receiving data to determine whether a congestion state occurs;

~~if a congestion state occurs, decrease said sender rate of said source node according to a first predetermined criterion if congestion occurs;~~

———(c) if no congestion state occurs, determine the bandwidth capacity of said network~~;~~ and~~,~~

———increase said sender rate of said source node according to a ~~second predetermined criterion~~first function of the determined bandwidth capacity~~if no congestion occurs~~; and,

(d) if a congestion state occurs, decrease said sender rate of said source node according to a second function.

34. (original) The machine-readable medium of claim 33, wherein said increase and decrease of said sender rate operate to establish a maximum data transmission rate and constant packet loss.

35. (currently amended) The machine-readable medium of claim 33, wherein ~~said~~the decreasing further comprises, in calculating said second function, calculating said sender rate raised to a power exceeding unity~~first and second predetermined criteria of said increasing and decreasing steps provide faster convergence to a stable operation~~.

36. (original) The machine-readable medium of claim 33, wherein said data flow from said source node is simultaneously transmitted to multiple destination nodes, and said bandwidth capacity is determined for each said data flow transmitted to each of said multiple destination nodes.

37. (currently amended) The machine-readable medium of claim 33, wherein the increasing further comprises, in calculating said first function, calculating said sender

rate raised to a power exceeding unity~~said steps of increasing and decreasing said sender rate above and below an operating point for said network provide a maximum throughput at minimum delay time~~.

38. (currently amended) The machine-readable medium of claim 33, wherein the step of decreasing said sender rate ($f_D(x_i)$) according to said ~~first predetermined criterion~~second function includes calculating the equation~~is determined according to the following equation~~:

$$x_{i+1} = x_i - \beta x^1 \quad \text{and} \quad \beta = 1 / \; mC^{1-1},$$

wherein x_{i+1} represents ~~the~~a next sending rate of data; x_i represents ~~said~~the current sending rate during cycle i; C represents the determined bandwidth capacity of said network, 1 represents a constant value greater than one; and, the value m ranges between $2 \leq m \leq 8$.

39. (currently amended) The machine-readable medium of claim 33, wherein the step of decreasing said sender rate according to said ~~second predetermined criterion~~first function includes calculating the equation~~is determined according to the following equation~~:

$$x_{i+1} = x_i + \alpha x^{-k} \quad \text{and}$$

$$\alpha = \frac{C^{k+1}}{D},$$

wherein x_{i+1} represents ~~the~~a next sending rate of data; x_i represents ~~said~~the current sending rate during cycle i; C represents the determined bandwidth capacity of said network, k represents a constant value less than negative one; and, the value D ranges between $5 \leq D \leq 20$.

40. (new) A congestion controller disposed at a source node for a network, said source node being configured for currently transmitting the data toward a destination node at a sender rate that is controlled by said controller, and that is dictated by a first function of a currently determined bandwidth capacity of said network if it is determined that no congestion is occurring in said network, said controller being =configured for adjusting a rate for currently transmitting said data toward said destination node according to a second function if the determination is that congestion is occurring in said network.